



- 1 -

REPLACEMENT SHEET

inert purge gas such as nitrogen is introduced at a high rate by opening valve 108 to purge the remaining precursor and reactant gases over the wafer. Simultaneously, valve 107 is opened to evacuate the expanded chamber. Subsequently, the pedestal is moved up, to the reactor compacted position, and a silanol precursor, such as tris-t- pentoxysilanol, is introduced into the chamber by opening valve 108. The silanol gas is at a pressure of about 1 Torr and the valve is opened for about 5 to 20 seconds, until the polymerization reaction at the wafer surface results in a silicon dioxide layer of about 100- 150 angstroms thickness. The aluminum oxide layer serves to catalyze the reaction that deposits the silicon dioxide. The pedestal is then lowered to expand the reaction chamber, and the purge gas is again introduced to stop the reaction and evacuate the chamber.

[0034] Fig. 4 depicts an alternate embodiment of the reactor apparatus of Fig. 1, with the pedestal in the raised position. In this embodiment, pedestal 102 has a diameter larger than the spacing between side walls 117. Pedestal 102 has chamfered edges 116 that correspond with the lower chamfered corners 118 of reactor walls 117. If film builds up on the reactor walls, the space between the pedestal and walls as in Fig. 1 will not become sealed, and the pedestal will not bind to the walls, even if the pedestal contacts chamfered corners 118.

[0035] Accordingly, the present invention provides an improved method and apparatus for a pulsed layer deposition in the fabrication of microelectronic circuits. The variable reactor chamber volume makes the process partially viable for ULSI processing. Additionally, the variable reaction chamber volume reduces the amount of precursors used while enabling high concentrations and fast reaction times to be achieved.

[0036] While the present invention has been particularly described, in conjunction with a specific preferred embodiment, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. It is therefore contemplated that the appended claims will embrace any such alternatives, modifications and variations as falling within the true scope and spirit of the present invention.

[0037] Thus, having described the invention, what is claimed is: